

Human Health Risk Summary and Mitigations – JH Stone Nursery

Prepared by Shawna Bautista, Regional Pesticide Use Coordinator and Invasive Plant Program Manager,
Pacific Northwest Region, USDA Forest Service

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This document summarizes the findings of human health risk assessments for the pesticides proposed to be used at the Forest Service JH Stone Nursery (JHSN) in Central Point, OR. Details of the analysis approach, exposure estimates and assumptions are found in each risk assessment. Also, results of accidental spills and associated risks can be found in each risk assessment, but are not included here as this summary reflects the intended uses.

Pesticides proposed for use at JHSN include:

Herbicides	Insecticides	Fungicides	Fumigant	Algaecide
2,4-D	Azadirachtin	Chlorothalonil	Dazomet	Sodium Carbonate Peroxyhydrate
Aminopyralid	Chlorpyrifos	Iprodione		
Clopyralid	Esfenvalerate	Mancozeb		
Dicamba	Pyriproxyfen	Mefenoxam		
Glyphosate	Bacillus thuringiensis israelensis (Bti)	Propiconazole		
Imazapic		Thiophanate-methyl		
Imazapyr		Thiram		
Oryzalin				
Oxyfluorfen				
Pendimethalin				
Prodiamine				

Risk assessments and local analyses (e.g. project file worksheets with quantitative estimates) identify no likely risks to workers or the public (central exposure estimates, non-accidental exposures) from the uses as proposed at JHSN for the following pesticides:

Aminopyralid, Azadirachtin, *Bacillus thuringiensis israelensis*, Clopyralid, Dicamba, Esfenvalerate, Glyphosate, Imazapic, Imazapyr, Iprodione, Mefenoxam, Oryzalin, Oxyfluorfen, Pendimethalin, Prodiamine, Propiconazole, Sodium carbonate peroxyhydrate, and Thiophanate-methyl.

2,4-D

JHSN use: 1 lb/ac on grass crops, about 85 acres/year total, broadcast applied by enclosed cab tractor.

The Forest Service risk assessment (SERA 2006) found that risks of adverse health outcomes were possible for workers exposed repeatedly over time, assuming a ground broadcast application of 112 acres/day and no specific clothing protection factor. However, anticipated use at the nursery is about 76 acres, the tractor used at JH Stone is an enclosed cab, and workers wear all Personal Protective

Equipment required by the label. The project file worksheet shows 66 acres and 6 hours of application/day result in much lower risks, well below the level of concern (Hazard Quotient (HQ) = 0.1). Therefore, given the operational considerations at JH Stone, there are no anticipated risks to workers.

Chlorothalonil

The only exposure scenario that exceeds a level of concern is chronic consumption of contaminated vegetation (project file worksheet, SERA 2015). Since none of the crops at JHSN are edible or available for public consumption, no exposures of concern are plausible for the proposed uses.

Chlorpyrifos

Workers: No chronic exposures are anticipated, given the limited use of chlorpyrifos at the JH Stone Nursery. Chlorpyrifos is applied to seedling beds in the greenhouses through an automated overhead system while the operator is at controls outside of the greenhouse. Re-entry intervals are complied with and posted (Justin, pers. com. 2019). All acute and intermediate exposures are below a level of concern (project file worksheets, SERA 2015). However, poor handling practices or other factors that would increase exposure could lead to unacceptable exposure levels for workers, so care in the use of proper PPE and adherence to re-entry intervals is essential (SERA 2015).

Public: All exposures that exceed a level of concern involve ingesting contaminated vegetation, fruit or fish. The use of chlorpyrifos at JHSN will be limited to use inside the greenhouses and shadehouses and none of the treated vegetation is edible or available for consumption by the public. The use in the greenhouses also eliminates the potential contamination of fish that could be consumed by the public. The greenhouses currently drain into an on-site artificial wetland, and not into Jackson Creek. Therefore, no contamination of food items available to the public is likely and no exposures of concern are anticipated.

Dazomet

Dazomet is a soil fumigant that is applied on the fields, immediately incorporated into the soil, the soil is then immediately compacted and sealed, and then immediately irrigated. The contact of the water with the dazomet causes rapid conversion to the gas, methyl isothiocyanate. It is the gaseous methyl isothiocyanate in the soil air spaces that kills the target pests and weed seeds.

For worker exposure, dazomet is the substance evaluated and only dermal exposures are involved. No dietary exposures to dazomet are plausible for workers or the general public. For inhalation exposures, methyl isothiocyanate is the primary toxic agent of concern. For exposures to the general public, plausible routes of exposure involve contaminated drinking water or fish, with methyl isothiocyanate as the toxic agent of concern.

The level of concern with exposure to methyl isothiocyanate (MITC) is eye irritation. During stable atmospheric conditions, levels of methyl isothiocyanate could produce eye irritation several hundred feet from the application site. However, the sealing and compacting of the soil keeps the MITC underground, the MITC dissipates after 48 hours, and strict buffer and re-entry interval requirements are in place. The primary people potentially exposed to MITC would be the workers, and they attend mandatory training, wear all required PPE and respirators, so substantial eye irritation is unlikely. In

addition, using data from monitoring as cited in SERA (2014), none of the exposures exceed the level of concern.

For worker exposure to dazomet, no exposures involving proper use of PPE exceed a level of concern. From SERA (2014): “Given the detailed description of worker PPE provided by the Forest Service and the requirements specified on the product label (Section 3.2.1.1), the HQ of 0.03 is clearly the only HQ relevant to the current assessment. This HQ is below the level of concern (HQ=1) by a factor of over 30. Thus, there is no basis for asserting that workers will be at risk of adverse effects associated with applications of dazomet.”

For the general public, none of the plausible routes of exposure lead to a level of concern (project file worksheets, SERA 2014). All HQ’s for public exposures, except accidental spills, are far below a level of concern.

Mancozeb

The only exposure scenario that exceeds a level of concern for mancozeb is an adult female consuming contaminated vegetation over several months (a chronic exposure) (project file worksheets, SERA 2015). Since none of the vegetation grown and treated at JHSN is edible or available for public consumption, this exposure scenario is not relevant to the proposed uses. Operational exposures to workers are well below the level of concern (project file worksheets, SERA 2015).

Pyriproxyfen

Pyriproxyfen is an insect growth regulator that works on many residential and agricultural insects. It is used in a variety of products including pet collars, carpet powders, and indoor foggers. Several studies indicate that pyriproxyfen is not likely to cause cancer, has not shown evidence of altering or damaging genes, and is not reported to be an endocrine disrupter. It is considered low in toxicity to humans, but can be mildly irritating to eyes (Hallman et al. 2015).

Exposures to the general public involve dietary scenarios. Chronic dietary exposure and risk estimates were below the EPA’s level of concern (LOC). No acute dietary risk assessment is available (EPA 2018). However, since none of the crops at JHSN are edible or available for public consumption, this limitation does not affect risk conclusions for proposed uses at the nursery.

Because pyriproxyfen is used in residential products as well as in agriculture, EPA did evaluate an “aggregate” risk of oral, dermal, and inhalation exposures. There are three sources for these types of exposures: food, drinking water, and residential uses. The long-term combined (dermal + incidental oral) risk estimate for children 1 to <2 years old from contact with dogs treated with a small pyriproxyfen collar results in the worst-case potential for pyriproxyfen chronic aggregate risk (EPA 2019). This combined aggregate exposure did not exceed the level of concern. The total long-term dietary and residential aggregated (dermal) MOE is 1,000 for adults. The chronic aggregate risk is not of concern (i.e., MOEs are > 100).

Exposure scenarios and quantitative risk assessments for pyriproxyfen are unusually limited for worker exposures in EPA documents. Risks to workers would involve dermal and inhalation exposures. Since EPA has not identified short-term and intermediate-term dermal and inhalation toxicological PoDs or

potential long-term handler/worker exposure scenarios for pyriproxyfen, a quantitative exposure and risk assessment for handlers/workers was not conducted (EPA 2018).

However, the European Food Safety Authority (2019) reports the following:

For operators, the exposure estimates were below the acceptable operator exposure level and the acute acceptable operator exposure level without the use of personal protective equipment (PPE) for outdoor (EFSA model) and indoor (Dutch greenhouse model) uses. Similarly, no concern was raised for residents and bystanders exposed during upward and downward spraying using the EFSA model. Finally, for the workers performing harvesting activities in the different crops, no PPE was required according to the EFSA model.

Therefore, there appears to be no likely risk to workers at JHSN from the application of pyriproxyfen.

Thiram

Thiram is used at JHSN only as a seed treatment. It has a low to moderate acute toxicity profile (generally Toxicity Category IV to II) (EPA 2004). The currently available toxicological database for thiram suggests that this chemical has the potential to be a significant neurotoxicant (in adults and children) as well as a developmental and reproductive toxicant.

Based on the toxicity profile, the EPA Health Effects Division has selected an endpoint based on neurotoxicity obtained from the Acute Neurotoxicity Study in Rats for use in the acute risk assessment. The endpoint selected for chronic risk assessment is based on changes in hematology, clinical chemistry, incidences for bile duct hyperplasia and reduction in body weight.

For dietary exposures to the public, thiram posed risks of concern. This exposure route is not relevant for the uses at JHSN, however, because no crops are edible or available for public consumption, so it does not affect human health risk conclusions for thiram use at the nursery.

The EPA 2004 Reregistration Eligibility Decision identified some exposures of concern for some “on farm seed treatments” (0.35-1.2 lbs/acre and 80 acres/day). It should be noted that the potential for exposure from powder applications are much higher than for liquid applications, due to the possibility of airborne dust, and the thiram at JHSN is a liquid formulation (Justin, pers. com. 2019). Using a correction factor in the EPA 2004 document to revise risk estimates for onion seed based on lower number of acres/day treated, the proposed use at JHSN (0.1 lbs on 1 or 2 acres) would result in exposures far below a level of concern. For example, the EPA level of concern is a “margin of exposure” < 100, and an estimated margin of exposure for the amount of seed and number of acres treated at JHSN would be 4,000 (project file, Human Health HQ summary worksheet).

Nevertheless, EPA did identify exposures of concern for some uses and required changes to PPE on product labels. Currently, mixers, loaders, and handlers of thiram or treated seed must now wear long-sleeved shirt, long pants, shoes, socks, and chemical resistant gloves.

With the current PPE requirements, the formulation used, the low amount of thiram used and low acreage planted, thiram use at JHSN does not appear to pose a risk to workers.

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